Recitation 10/3 Recitation

1. Let $\mathbf{v} \in \mathbb{R}^n$ and $c \in \mathbb{R}$. Show that $||c\mathbf{v}|| = |c|||\mathbf{v}||$.

2. Let V be any subspace of $\mathbb{R}^n$. Show that the zero subspace $\{\mathbf{0}\}$ is orthogonal to V.

3. Let $V = \text{Span}\left\{ \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}, \begin{bmatrix} -1 \\ 3 \\ 14 \end{bmatrix} \right\}$ and $W = \text{Span}\left\{ \begin{bmatrix} 1 \\ 2 \\ a \end{bmatrix} \right\}$. Determine the values of a (if any) that makes $V \perp W$. What is going on geometrically?

4. Let $V = \text{Span}\{\mathbf{v}, \mathbf{w}\}$ be a subspace of $\mathbb{R}^n$. Show that if $\mathbf{u}$ is orthogonal to $\mathbf{v}$ and $\mathbf{w}$, then it is orthogonal to V (that is, it is orthogonal to all vectors in V).

5. Open the **Julia8DotProducts** notebook to see relevant dot product commands. Then complete some of the "Coding Exercises" at the bottom of the notebook.